



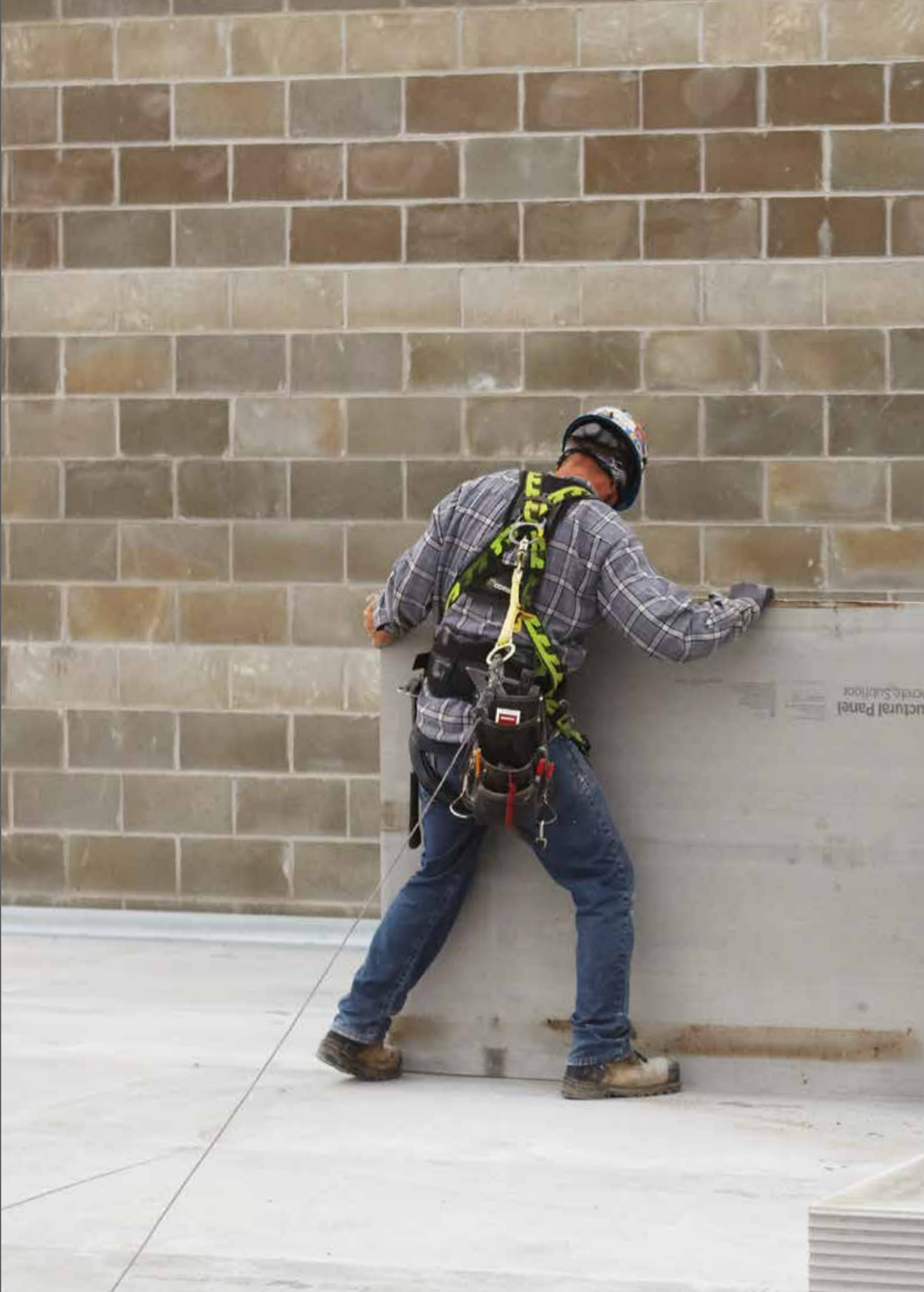
USG STRUCTURAL PANEL CONCRETE SUBFLOOR REPAIR MANUAL

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USG STRUCTURAL PANEL CONCRETE SUBFLOOR

HOLE PATCH REPAIR

Repair holes that may be created upon construction to the USG Structural Panel Concrete Subfloor with USG Durock™ Brand EXG™ Concrete Repair Patch.

1. PATCH REPAIR LIMITATION

USG permits square holes of max. 6" by max. 6" or round holes max. 6" in diameter to be made in the Concrete Subfloor panel without the need of additional framing. For any larger required holes, the panels must be supported around the hole as outlined in USG document, *Field Installation Guidelines (SCP14)*, section titled *Panel Penetrations*, page 7.

Follow these guidelines for the repair of holes that are at max 6" x 6" square, or round 6" diameter. For larger holes that need to be repaired, a rectangular section of the panels must be cut out from supporting joist to supporting joist and replaced with additional supporting framing as outlined in USG document, *Field Installation Guidelines (SCP14)*, section titled *Panel Blocking*, page 6.

The patch solution outlined here will maintain the 550lb. concentrated rating of the Concrete Subfloor as tested in accordance with ASTM E661.

For additional questions regarding this repair, please contact your USG Structural representative (see back of manual).

2. TOOLS REQUIRED

The following tools are required for the repair:

- Industrial vacuum
 - Stiff bristled brush
 - Screwdriver
 - Damp rags
 - Hole saw (to be used with electric drill), reciprocating saw or electric jigsaw
 - Duct tape or section of flat strap steel (any gauge greater than 20) at least 2" longer than the largest diameter and identical in width to the hole being repaired
 - Vice grips
 - 2.5- or 5-gallon pail
 - Mixing paddle for attachment to an electric drill
 - Electric drill
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3. HOLE PREPARATION

- A. Before any attempt is made to file and repair the hole, it is imperative that all loose material found in the damaged area is removed. This includes parts of the damaged Concrete Subfloor panel that may be cracked and/or loose and still attached. Use a screwdriver to probe the damaged area. If the broken pieces in the damaged area are loose, remove them with a hole saw, jigsaw or reciprocating saw until only solid panel remains.

**3. HOLE
PREPARATION
CONT.**



- B.** Remove all dust or cracked pieces with a vacuum or stiff bristled brush. Wipe the damaged area with a damp rag to ensure all small, loose material is removed. No loose pieces should remain attached to the panel.

**4. BACKING THE
HOLE—ACCESS TO
THE BOTTOM OF
THE PANEL**

- A.** Ensure that all loose and moving pieces have been removed from the top or bottom of the damaged area (like in section #3 above). Use a damp cloth to wipe the bottom of the panel around the damaged area. Allow to dry. It is imperative that the bottom of the panel around the damaged area is smooth and level. No damaged panel pieces can be allowed to protrude downward from the hole.



- B.** Use ordinary duct tape and cut as many pieces necessary to cover the damaged area. Ensure that the strips are longer than the damaged area by at least 1" on either side of the hole. If the damage area is 4" long, cut several strips 6" long.



4. BACKING THE HOLE—ACCESS TO THE BOTTOM OF THE PANEL CONT.

5. BACKING THE HOLE—NO ACCESS TO THE BOTTOM OF THE PANEL

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- C. Apply the strips of duct tape to the bottom of the panel next to each other, in parallel, such that you cover the entire damaged area from below. To ensure the duct tape sticks securely, it is critical that the bottom of the damaged area be flush and smooth without any loose, moving pieces.
-

- A. Once all loose and moving pieces have been removed, use a damp cloth to wipe the bottom of the panel around the damaged area. Allow to dry. It is imperative that the bottom of the panel around the damaged area be smooth and level. No damaged panel pieces should be protruding downward from the hole.
- B. Prepare a piece of flat strap that is slightly narrower than the widest part of the hole being repaired. The cut flat strap should be a couple of inches longer than the longest part of the damaged hole, to allow for extra space for attaching the flat strap to the panel using fasteners.



- C. Screw a fastener into the center of the cut flat strap piece. Hold the strap by the screw, insert one side into the hole and slide it in until the whole strap can be inserted into the hole.



5. BACKING THE HOLE—NO ACCESS TO THE BOTTOM OF THE PANEL CONT.

- D.** Hold onto the screw with a pair of vise-grips or pliers and pull up on the screw, holding the flat strap tight against the bottom of the damaged hole.



- E.** Drive fasteners through the panel and into the flat strap to secure strap.



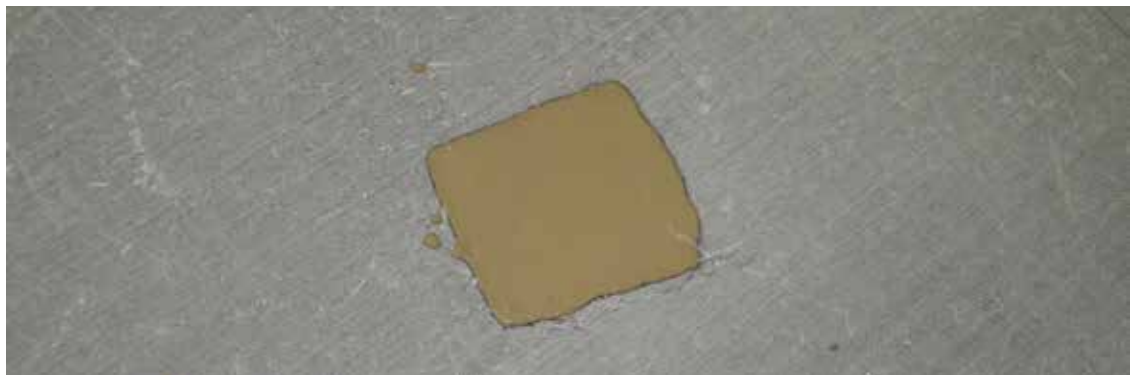
- F.** Once the flat strap is secure to the bottom of the damaged hole, remove the set screw in the middle of the flat strap.

6. PREPARING AND POURING THE PATCH MATERIAL

USG recommends USG Durock™ Brand EXG™ Concrete Repair Patch as the patch repair material for USG Structural Panel Concrete Subfloor. Depending on the size of the repair patch, it is recommended that only enough USG Durock™ EXG material be mixed to fill the patch. If there are multiple patches to be repaired, only enough USG Durock™ EXG should be mixed to fill one of the patches at a time. Add water to the USG Durock™ EXG compound in accordance with the instructions as listed on the side of the packaging. Caution: the USG Durock™ EXG fill material sets rather quickly (pour and trowel time is about 5 minutes). Refer to *USG Durock™ EXG Concrete Repair Patch* data sheet (CB792) for additional technical information.

**6. PREPARING
AND POURING THE
PATCH MATERIAL
CONT.**

- A.** In most cases, a trowel is not needed to fill the repair area. Simply mix 6 parts USG Durock™ EXG Concrete Repair Patch to 1 part water by volume, or 2.0–2.5 quarts (1.9–2.4 L) of water per one 50 lb. (22.7 kg) bag of USG Durock™ EXG Concrete Repair Patch. Then, slowly pour it into the hole to be repaired. Pour slowly until the hole is filled and level with the surrounding panel.



- B.** Troweling the patch compound is not necessary. A trowel should be used to remove excess patch material, but all attempts should be made to simply pour enough patching compound into the hole until level.



TONGUE AND GROOVE REPAIR

A. Using Patch Compound Without Access to the Bottom of the Panel

Repair tongue and groove joints found at the long side of the USG Structural Panel Concrete Subfloor with USG Durock™ Brand EXG Concrete Repair Patch. It is assumed for this repair that there is no access to the bottom of the panel.

1. TONGUE AND GROOVE REPAIR LIMITATION

USG permits 10% of the tongue and groove along the long sides of the panels to be damaged or missing before the whole joint along the affected panel needs to be completely backed by 16ga. Katz Blocking or 16ga. flat strap. These backing pieces need to be placed underneath the tongue and groove joint along the whole length of the panel, and the panel needs to be fastened every 6" along the whole length of the tongue and groove joint. Please refer to USG document, *Field Installation Guidelines (SCP14)*, section titled *Panel Blocking*, page 6.

The tongue and groove solution outlined here will maintain the capacities of the USG Structural Panel Concrete Subfloor in accordance with the code report ESR-1792 and PER-13067.

Should you have any questions or concerns with any part of this repair, please contact your USG Structural representative as outlined on the back of the guide.

2. TOOLS REQUIRED

The following tools are required for the repair:

- USG Durock™ Brand EXG Concrete Repair Patch
 - Industrial vacuum (preferably with HEPA filter) or compressed air
 - Stiff bristled brush
 - Screwdriver
 - Skill saw with adjustable blade depth and dry vacuum attachment.
 - 2.5- or 5-gallon pail
 - Mixing paddle for attachment to an electric drill
 - Electric drill
 - 4" taping knife
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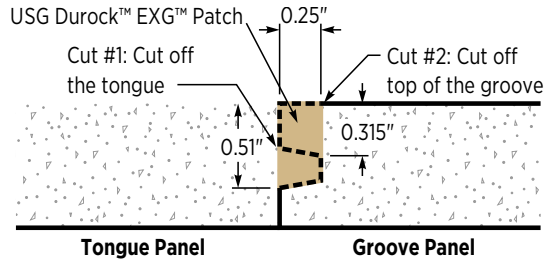
3. TONGUE AND GROOVE REPAIR WITHOUT ACCESS TO THE BOTTOM OF THE PANEL

- A. Before any attempt is made to file and repair the hole in question, it is imperative that all loose material found in the damaged area be removed. Use a screwdriver to probe the damaged area. If the broken pieces in the damaged area are loose and move, use the stiff bristle brush to loosen any broken material or dislodge any construction debris. Use the vacuum to remove the loose materials from the joint.

3. TONGUE AND GROOVE REPAIR WITHOUT ACCESS TO THE BOTTOM OF THE PANEL CONT.

- B.** Using the circular saw, cut off the damaged tongue (cut must be at least 9/16" deep). Using the circular saw, make a 3/8" deep cut, 1/4" away from the joint edge of the board with the groove. This will remove the top part of the groove, which will allow you to pour the patch material into the joint.

Method 1



- C.** Use a tapping knife to clean out the cut pieces of structural panel from the joint.
- D.** Remove dust from the cut joint using a damp rag, a vacuum or blow the dust out using compressed air.



3. TONGUE AND GROOVE REPAIR WITHOUT ACCESS TO THE BOTTOM OF THE PANEL CONT.

- E.** Mix 6 parts USG Durock™ EXG Concrete Repair Patch to 1 part water by volume, or 2.0–2.5 quarts (1.9–2.4 L) of water per one 50 lb. (22.7 kg) bag of USG Durock™ EXG Concrete Repair Patch. Do not mix more material than can be used in 5 minutes.



- F.** Slowly pour the mixed patch into the cut joint. The cut joint should be completely filled with the patch and it should be slightly overflowing.



- G.** Using a tape knife, work the patch material into the joint. Feather out the patch in order to achieve a smooth and level surface.



- H.** Let the patch dry for 1 hour before resuming normal traffic. The surface of the patch can be cleaned up once the patch has completely dried.

1. TONGUE AND GROOVE REPAIR LIMITATION

B. Using Patch Compound with Access to the Bottom of the Panel

Repair the tongue and groove joints found at the long side of the USG Structural Panel Concrete Subfloor with USG Durock™ Brand EXG Concrete Repair Patch. It is assumed for this repair that the bottom of the panel is accessible.

USG permits 10% of the tongue and groove along the long sides of the panels to be damaged or missing before the whole joint along the affected panel needs to be completely backed by 16ga. Katz Blocking or 16ga. flat strap. These backing pieces need to be placed underneath the tongue and groove joint along the whole length of the panel, and the panel needs to be fastened every 6" along the whole length of the tongue and groove joint. Please refer to USG document, *Field Installation Guidelines (SCP14)*, section titled *Panel Blocking*, page 6.

The tongue and groove solution outlined here will maintain the capacities of the USG Structural Panel Concrete Subfloor in accordance with the code report ESR-1792 and PER-13067.

Should you have any questions or concerns with any part of this repair, please contact your USG Structural representative as outlined on the back of the guide.

2. TOOLS REQUIRED

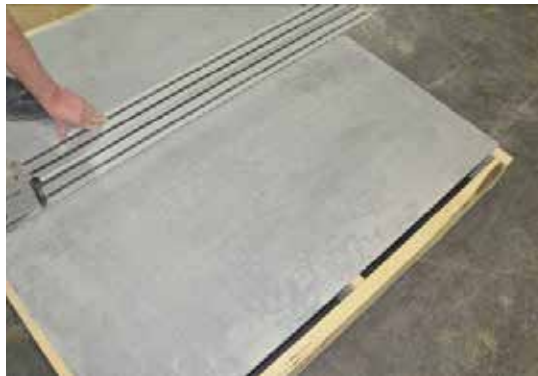
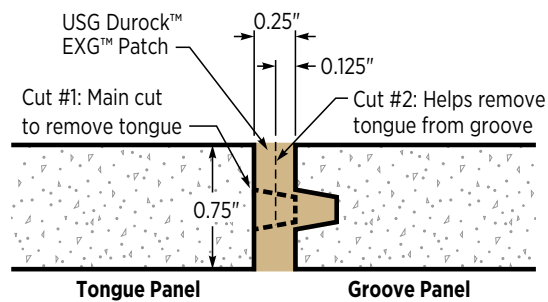
The following tools are required for the repair:

- USG Durock™ Brand EXG Concrete Repair Patch
- Industrial vacuum (preferably with HEPA filter) or compressed air
- Stiff bristled brush
- Screw driver
- Skill saw with adjustable blade depth and dry vacuum attachment
- 2.5- or 5-gallon pail
- Mixing paddle for attachment to an electric drill
- Electric drill
- 4" taping knife

3. TONGUE AND GROOVE REPAIR WITH ACCESS TO THE BOTTOM OF THE PANEL

- A. Before any attempt is made to file and repair the hole in question, it is imperative that all loose material found in the damaged area be removed. Use a screwdriver to probe the damaged area. If the broken pieces in the damaged area are loose and move, use the stiff bristle brush to loosen any broken material or dislodge any construction debris. Use the vacuum to remove the loose materials from the joint.
- B. Using the circular saw make a through cut, 1/4" away from the joint edge of the board with the tongue. Make a second cut in the same board approximately 1/8" away from the edge of the board. The second cut helps remove the tongue out of the groove.

Method 2



- C. Use a taping knife to clean out the cut pieces of structural panel from the joint.
- D. Remove dust from the cut joint using a damp rag or blow the dust out using compressed air.



3. TONGUE AND GROOVE REPAIR WITH ACCESS TO THE BOTTOM OF THE PANEL CONT.

- E.** Place duct tape on the back of the panel over the joint. Make sure that the joint is completely covered so that the patch material does not drip out of the joint.



- F.** Mix a small batch of the USG Durock™ EXG Concrete Repair Patch in a 6-to-1 ratio with water. Do not mix more material than can be used in 5 minutes.



3. TONGUE AND GROOVE REPAIR WITH ACCESS TO THE BOTTOM OF THE PANEL CONT.

- G.** Slowly pour the mixed patch into the cut joint. The cut joint should be completely filled with the patch and it should be slightly overflowing.



- H.** Using a tape knife, work the patch material into the joint. Feather out the edges in order to achieve a smooth and level surface.



- I.** Let the patch dry for 1 hour before resuming normal traffic. The surface of the patch can be cleaned up once the patch has completely dried.

C. Using Steel Strap with Access Only from the Top

Repair the tongue and groove joints on the USG Structural Panel Concrete Subfloor when there is access only from the top, and when carpet and residential pad are used as the floor covering. This tongue and groove solution will not work for any other floor covering.

USG permits 10% of the tongue and groove along the long sides of the panels to be damaged or missing before the whole joint along the affected panel needs to be completely backed by 16ga. Katz Blocking or 16ga. flat strap. These backing pieces need to be placed underneath the tongue and groove joint along the whole length of the panel and the panel needs to be fastened every 6" along the whole length of the tongue and groove joint. Please refer to USG document, *Field Installation Guidelines (SCP14)*, section titled *Panel Blocking*, page 6.

The tongue and groove solution outlined here will maintain the capacities of the USG Structural Panel Concrete Subfloor in accordance with the code report ESR-1792 and PER-13067.

Should you have any questions or concerns with any part of this repair, please contact your USG Structural representative as outlined on the back of the guide.

1. TOOLS REQUIRED

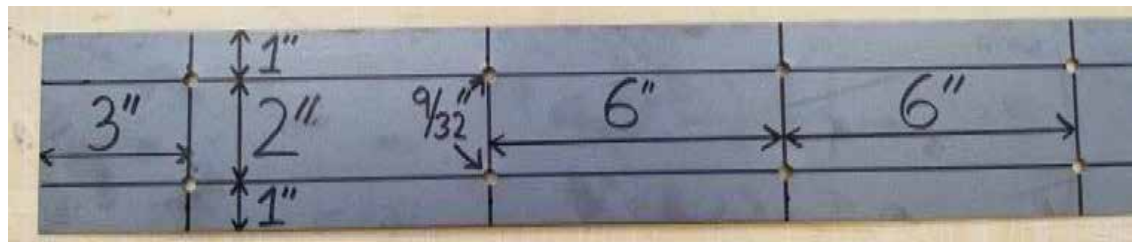
The following is a list of tools required for the repair:

- 3" long SFS peel rivets
 - Peel rivet setting tool:
 - A. Hand operated setting tool
 - B. Pneumatic setting tool
 - 16ga., 4" wide steel flat strap (as long as necessary to cover the damaged tongue and groove plus 2")
 - 9/32" drill bit
 - Electric drill
-

2. INSTALLATION OF STEEL STRAP OVER DAMAGED TONGUE AND GROOVE

- A. Starting 3" from the short edge, drill or punch 9/32" holes in the flat strap 6" apart. The holes should be made 1" away from the long edge of the strap and 1" away from the panel joint once the flat strap is installed on the panel.

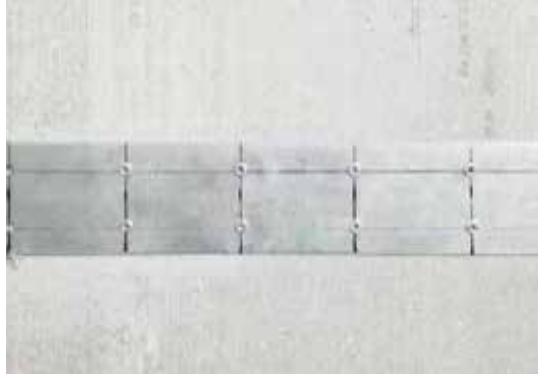
6" o.c. peel rivet layout in the flat strap



2. INSTALLATION OF STEEL STRAP OVER DAMAGED TONGUE AND GROOVE CONT.

- B.** Place the pre-drilled flat strap on the damaged tongue and groove joint and drill 9/32" holes in the structural panel using the flat strap as a guide. Before drilling, make sure that the flat strap is centered on top of the joint so that the holes are located 1" away from the joint. Furthermore, ensure that the strap extends past the damaged tongue and groove by at least 1" on each end of the joint.

Correct repair view from the top.



Correct repair view from the bottom.



- C.** Insert 3" long SFS peel rivets into the pre-drilled holes. Using one of the recommended setting tools, install the peel rivets. The peel rivet must be "pulled" until the mandrel breaks off, which ensures a tight connection.

A pneumatic setting tool is used to install the peel rivets.



Note: This repair should only be used if the floor covering is going to be carpet and at least a 1/2" thick residential pad.

CONTACT INFORMATION

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SAMPLES, LITERATURE AND PRODUCT INFORMATION

usg.com/structural

TECHNICAL SERVICE

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MSRP based upon full truckload
delivered to jobsite:
Subfloor: \$4.50/sf

DANGER

Causes skin irritation. Causes serious eye damage. May cause an allergic skin reaction. May cause respiratory irritation. May cause cancer by inhalation of respirable crystalline silica. Do not handle until all safety precautions have been read and understood. Avoid breathing dust. Use only in a well-ventilated area and wear a NIOSH/MSHA approved respirator. Wear protective gloves/protective clothing/eye protection. If in eyes: rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing. Immediately call a poison center/doctor. If on skin: wash with plenty of water. Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. If skin irritation or rash occurs, or otherwise exposed or concerned: get medical attention. Store locked up. Dispose of in accordance with local, state and federal regulations.

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SAFETY FIRST!

Follow good safety and industrial hygiene practices during handling and installation of all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read Safety Data Sheets and related literature on products before specification and/or installation.

